

IALCCE 2020

The Seventh International Symposium on Life-Cycle Civil Engineering

27-30 October 2020, Shanghai, China



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Life-Cycle Civil Engineering*

Nowadays, people have realized the importance of creating a sustainable society to avoid or alleviate problems like climate change, environmental pollution or economic crisis. Therefore, the life-cycle thinking of civil engineering is discussed more and more frequently.

Civil engineering is mainly focused on design and construction during the past days, but contemporary society needs civil engineering to pay attention to more aspects, such as inspection, monitoring, repair, maintenance and optimal management of structures and infrastructures, in order to effectively manage the function of these structures throughout their lifetime. Considering these needs, the objective of the International Association for Life-Cycle Civil Engineering (IALCCE) is to promote international cooperation in this field of expertise to enhance the welfare of society. Its mission is to become the premier international organization for the advancement of the life-cycle civil engineering.

Previous editions of the bi-annual IALCCE symposium took place in Varenna, Lake Como (2008), Taipei (2010), Vienna (2012), Tokyo (2014), Delft (2016) and Ghent (2018). The Seventh International Symposium on Life Cycle Civil Engineering (IALCCE 2020) will be organized on behalf of IALCCE under the auspices of Tongji University in Shanghai (China) on October 27-30, 2020.

All major aspects of life-cycle engineering are addressed, with special focus on structural damage processes, life-cycle design, inspection, monitoring, assessment, maintenance and rehabilitation, life-cycle cost of structures and infrastructures, life-cycle performance of special structures, and life-cycle oriented computational tools.

We are looking forward to welcome all of you in Shanghai in 2020!

Mini-Symposium MS-1:

Life-Cycle Redundancy, Robustness and Resilience Indicators
for Aging Structural Systems under Multiple Hazards

Objective of the Mini-Symposium MS-1



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Structural systems, due to their inherent vulnerability, are at risk from aging, fatigue and deterioration processes due to aggressive chemical attacks and other physical damage mechanisms. The detrimental effects of these phenomena can lead over time to unsatisfactory structural performance under service loadings or accidental actions and extreme events, such as natural hazards and man-made disasters. The exposure to combined effects of discrete and continuous damaging events pose a major challenge to the field of structural engineering. The classical time-invariant structural design criteria and methodologies need to be revised to account for a proper modeling of the structural system over its entire life-cycle by taking into account the effects of deterioration processes, time-variant loadings, and maintenance and repair interventions under uncertainty. Despite these needs and recent research advances, life-cycle concepts are not yet explicitly addressed in structural design codes. Moreover, the level of structural performance is generally specified with reference to structural safety and reliability. However, when aging and deterioration are considered, the evaluation of the system performance should account for additional probabilistic indicators aimed to provide a comprehensive description of the life-cycle structural resources, such as redundancy, robustness and resilience. Based on these considerations and following the successful events organized at IALCCE2016 and IALCCE2018, the purpose of this IALCCE2020 Mini-Symposium is to present principles, concepts, methods, and strategies for measuring and evaluating the life-cycle risk, reliability, redundancy, robustness and resilience of deteriorating structural systems under multiple hazards, with emphasis on the interaction between seismic and environmental hazards.

Note: Mini-Symposium organized on behalf of the SEI/ASCE Technical Council on Life-Cycle Performance, Safety, Reliability and Risk of Structural Systems, Task Group 2 on Reliability-based Structural System Performance Indicators.